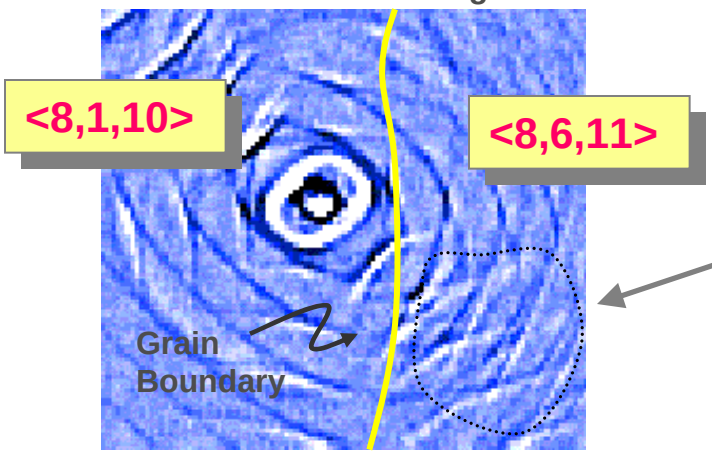
Idaho National Laboratory

Surface Acoustic Waves Across Boundaries

We have developed with collaborators in Japan, a technique to image the interaction of GHz surface acoustic waves with individual microstructural features such as grain boundaries. The movie below shows a thermoelastically excited surface acoustic wave propagate across a boundary between two highly anisotropic copper crystallites.

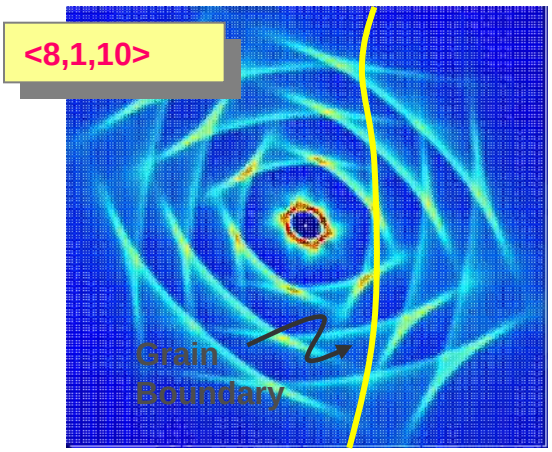
Interferometric Image



200 μm × 200 μm

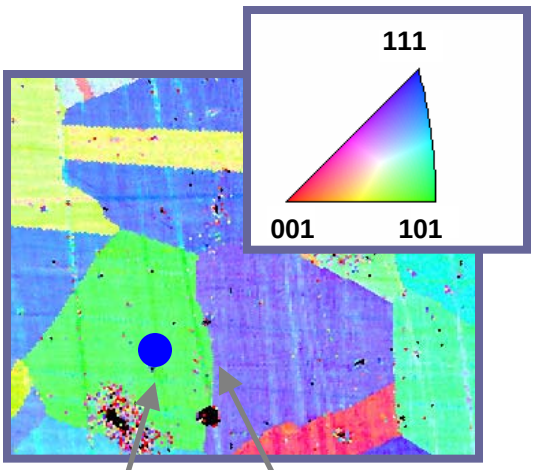
The wavefront shape changes as the wave crosses the boundary. This acoustic refraction is due to the large acoustic mismatch between the two copper crystallites.

Simulation without G.B.



200 μm × 200 μm

Electron backscatter image



Generation site

Grain boundary between the <8,1,10> and <8,6,11> crystallite

David Hurley, Idaho National Laboratory, David.Hurley@inl.gov, (208) 526-3665